

We want to thank the reviewer for the insightful comments and recommendations. Following the suggestions, we will revise the manuscript. We will try to explain the methodologies clearly and improve the writing. Detailed responses to the reviewers' comments are added below.

Note: Below is our response (italics) to each comment (regular font) from the reviewer

1. Clarity and Structure: The abstract is well-structured, presenting the problem, the proposed solution, and a few findings. However, some sentences are complex (starting from the title), and more concise wording could enhance clarity,

Response: *We thank the reviewer for this comment. We will revise the complex sentences to enhance their readability.*

2. Methodology: The use of the Lifyears Index (LYI) as a measure for socioeconomic flood impact is well explained. It would be beneficial to provide a brief explanation of how the geomorphologically guided machine learning approach works, even if it is in a bit summary.

Response: *We thank the reviewer for this comment. We will revise the methodology to be clearer on the geomorphologically guided machine learning approach with the following information-*

Integrating geomorphological knowledge into the interpretation of machine learning models to better understand the relationships between input variables and the predicted outcomes can be crucial. This may involve analyzing feature importance, spatial patterns, and model outputs in the context of geomorphological processes. In this study, we have introduced Flood Geomorphic potential (FGP) as a variable in the ML model to predict socioeconomic flood impact. Flooding is directly related to the climate and geomorphologic processes, thus incorporating FGP together with the climate index in the analysis allows our model to be physically driven. The main advantage of the approach is that it is based on an automatic technique that relies on globally available datasets thus offering the opportunity to apply this to different areas.

3. Data: The abstract mentions training the model with over 6000 flood events from 1980 to 2020, but it is mentioned that the model shows variability from 1980 to 2022 as temporal Coverage. So, /what's the correct timeline?

Response: *Thank you for pointing this out. There is a mistake and both of them should be the same. It should be 1980 to 2022.*

4. Conclusion: A brief conclusion summarizing the main contributions and implications of the study would be beneficial.

Response: *Thank you for the suggestions. We will revise the conclusion and discuss the main contributions and implications of the study more elaborately as per the reviewer's comments.*